

AMENDATORY SECTION (Amending Order 73-5, filed 5/9/73 and Order 73-4, filed 5/7/73)

WAC 296-24-69003 Spot and seam welding machines (nonportable). (1) Voltage. All external weld initiating control circuits shall operate on low voltage, not over 120 volts.

(2) Capacitor welding. Stored energy or capacitor discharge type of resistance welding equipment and control panels involving high voltage (over 550 volts) shall be suitably insulated and protected by complete enclosures, all doors of which shall be provided with suitable interlocks and contacts wired into the control circuit (similar to elevator interlocks). Such interlocks or contacts shall be so designed as to effectively interrupt power and short circuit all capacitors when the door or panel is open. A manually operated switch or suitable positive device shall be installed, in addition to the mechanical interlocks or contacts, as an added safety measure assuring absolute discharge of all capacitors.

(3) Interlocks. All doors and access panels of all resistance welding machines and control panels shall be kept locked and interlocked to prevent access, by unauthorized persons, to live portions of the equipment.

(4) Guarding. All press welding machine operations, where there is a possibility of the operator's fingers being under the point of operation, shall be effectively ~~((guarded by the use of a device such as an electronic eye safety circuit, two hand controls or protections similar to that prescribed for punch press operation, WAC 296-24-19501 through 296-24-19513))~~ safeguarded according to the machine safety requirements in WAC 296-806-20044 through 296-806-20054. All chains, gears, operating bus linkage, and belts shall be protected by adequate guards, in accordance with ~~((WAC 296-24-20501 through 296-24-20533))~~ the machine safety requirements in WAC 296-806-20042.

(5) Shields. The hazard of flying sparks shall be, wherever practical, eliminated by installing a shield guard of safety glass or suitable fire-resistant plastic at the point of operation. Additional shields or curtains shall be installed as necessary to protect passing persons from flying sparks. (See WAC 296-24-70003 (1)(c).)

(6) Foot switches. All foot switches shall be guarded to prevent accidental operation of the machine.

(7) Stop buttons. Two or more safety emergency stop buttons shall be provided on all special multispot welding

machines, including 2-post and 4-post weld presses.

(8) Safety pins. On large machines, four safety pins with plugs and receptacles (one in each corner) shall be provided so that when safety pins are removed and inserted in the ram or platen, the press becomes inoperative.

(9) Grounding. Where technically practical, the secondary of all welding transformers used in multispot, protection and seam welding machines shall be grounded. This may be done by permanently grounding one side of the welding secondary current circuit. Where not technically practical, a center tapped grounding reactor connected across the secondary or the use of a safety disconnect switch in conjunction with the welding control are acceptable alternates. Safety disconnect shall be arranged to open both sides of the line when welding current is not present.

AMENDATORY SECTION (Amending WSR 00-08-078, filed 4/4/00, effective 7/1/00)

WAC 296-24-88020 Powered platform installations--Equipment. (1) General requirements. The following requirements apply to equipment which are part of a powered platform installation, such as platforms, stabilizing components, carriages, outriggers, davits, hoisting machines, wire ropes and electrical components.

(a) Equipment installations must be designed by or under the direction of a registered professional engineer experienced in such design;

(b) The design must provide for a minimum live load of 250 pounds (113.6 kg) for each occupant of a suspended or supported platform;

(c) Equipment that is exposed to wind when not in service must be designed to withstand forces generated by winds of at least 100 miles per hour (44.7 m/s) at 30 feet (9.2 m) above grade; and

(d) Equipment that is exposed to wind when in service must be designed to withstand forces generated by winds of at least 50 miles per hour (22.4 m/s) for all elevations.

(2) Construction requirements. Bolted connections must be self-locking or must otherwise be secured to prevent loss of the connections by vibration.

(3) Suspension methods. Elevated building maintenance equipment must be suspended by a carriage, outriggers, davits or an equivalent method.

(a) Carriages. Carriages used for suspension of elevated

building maintenance equipment must comply with the following:

(i) The horizontal movement of a carriage must be controlled so as to ensure its safe movement and allow accurate positioning of the platform for vertical travel or storage;

(ii) Powered carriages must not exceed a traversing speed of 50 feet per minute (0.3 m/s);

(iii) The initiation of a traversing movement for a manually propelled carriage on a smooth level surface must not require a person to exert a horizontal force greater than 40 pounds (444.8 n);

(iv) Structural stops and curbs must be provided to prevent the traversing of the carriage beyond its designed limits of travel;

(v) Traversing controls for a powered carriage must be of a continuous pressure weatherproof type. Multiple controls when provided must be arranged to permit operation from only one control station at a time. An emergency stop device must be provided on each end of a powered carriage for interrupting power to the carriage drive motors;

(vi) The operating control(s) must be so connected that in the case of suspended equipment, traversing of a carriage is not possible until the suspended portion of the equipment is located at its uppermost designed position for traversing; and is free of contact with the face of the building or building guides. In addition, all protective devices and interlocks are to be in the proper position to allow traversing of the carriage;

(vii) Stability for underfoot supported carriages must be obtained by gravity, by an attachment to a structural support, or by a combination of gravity and a structural support. The use of flowing counterweights to achieve stability is prohibited.

(A) The stability factor against overturning must not be less than 2 for horizontal traversing of the carriage, including the effects of impact and wind.

(B) The carriages and their anchorages must be capable of resisting accidental over-tensioning of the wire ropes suspending the working platform, and this calculated value must include the effect of one and one-half times the stall capacity of the hoist motor. All parts of the installation must be capable of withstanding without damage to any part of the installation the forces resulting from the stall load of the hoist and one-half the wind load.

(C) Roof carriages which rely on having tie-down devices secured to the building to develop the required stability against overturning must be provided with an interlock which will prevent vertical platform movement unless the tie-down is engaged;

(viii) An automatically applied braking or locking system, or equivalent, must be provided that will prevent unintentional

traversing of power-traversed or power assisted carriages;

(ix) A manual or automatic braking or locking system or equivalent, must be provided that will prevent unintentional traversing of manually propelled carriages;

(x) A means to lock out the power supply for the carriage must be provided;

(xi) Safe access to and egress from the carriage must be provided from a safe surface. If the carriage traverses an elevated area, any operating area on the carriage must be protected by a guardrail system in compliance with the provisions of subsection (5)(a)(vi) of this section. Any access gate must be self-closing and self-latching, or provided with an interlock;

(xii) Each carriage work station position must be identified by location markings and/or position indicators; and

(xiii) The motors must stall if the load on the hoist motors is at any time in excess of three times that necessary for lifting the working platform with its rated load.

(b) Transportable outriggers.

(i) Transportable outriggers may be used as a method of suspension for ground rigged working platforms where the point of suspension does not exceed 300 feet (91.5 m) above a safe surface. Tie-in guide system(s) must be provided which meet the requirements of WAC 296-24-88015(2).

(ii) Transportable outriggers must be used only with self-powered, ground rigged working platforms.

(iii) Each transportable outrigger must be secured with a tie-down to a verified anchorage on the building during the entire period of its use. The anchorage must be designed to have a stability factor of not less than 4 against overturning or upsetting of the outrigger.

(iv) Access to and egress from the working platform must be from and to a safe surface below the point of suspension.

(v) Each transportable outrigger must be designed for lateral stability to prevent roll-over in the event an accidental lateral load is applied to the outrigger. The accidental lateral load to be considered in this design must be not less than 70 percent of the rated load of the hoist.

(vi) Each transportable outrigger must be designed to support an ultimate load of not less than 4 times the rated load of the hoist.

(vii) Each transportable outrigger must be so located that the suspension wire ropes for two point suspended working platforms are hung parallel.

(viii) A transportable outrigger must be tied-back to a verified anchorage on the building with a rope equivalent in strength to the suspension rope.

(ix) The tie-back rope must be installed parallel to the centerline of the outrigger.

(c) Davits.

(i) Every davit installation, fixed or transportable, rotatable or nonrotatable must be designed and installed to insure that it has a stability factor against overturning of not less than 4.

(ii) The following requirements apply to roof rigged davit systems:

(A) Access to and egress from the working platform must be from a safe surface. Access or egress must not require persons to climb over a building's parapet or guard railing; and

(B) The working platform must be provided with wheels, casters or a carriage for traversing horizontally.

(iii) The following requirements apply to ground rigged davit systems:

(A) The point of suspension must not exceed 300 feet (91.5 m) above a safe surface. Guide system(s) must be provided which meet the requirements of WAC 296-24-88015(2);

(B) Access and egress to and from the working platform must only be from a safe surface below the point of suspension.

(iv) A rotating davit must not require a horizontal force in excess of 40 pounds (177.9 n) per person to initiate a rotating movement.

(v) The following requirements shall apply to transportable davits:

(A) A davit or part of a davit weighing more than 80 pounds (36 kg) must be provided with a means for its transport, which must keep the center of gravity of the davit at or below 36 inches (914 mm) above the safe surface during transport;

(B) A davit must be provided with a pivoting socket or with a base that will allow the insertion or removal of a davit at a position of not more than 35 degrees above the horizontal, with the complete davit inboard of the building face being serviced; and

(C) Means must be provided to lock the davit to its socket or base before it is used to suspend the platform.

(4) Hoisting machines.

(a) Raising and lowering of suspended or supported equipment must be performed only by a hoisting machine.

(b) Each hoisting machine must be capable of arresting any overspeed descent of the load.

(c) Each hoisting machine must be powered only by air, electric or hydraulic sources.

(d) Flammable liquids must not be carried on the working platform.

(e) Each hoisting machine must be capable of raising or lowering 125 percent of the rated load of the hoist.

(f) Moving parts of a hoisting machine must be enclosed or guarded in compliance with ~~((Part C of chapter 296-24 WAC))~~ chapter 296-806 WAC, Machine safety.

(g) Winding drums, traction drums and sheaves and directional sheaves used in conjunction with hoisting machines must be compatible with, and sized for, the wire rope used.

(h) Each winding drum must be provided with a positive means of attaching the wire rope to the drum. The attachment must be capable of developing at least 4 times the rated load of the hoist.

(i) Each hoisting machine must be provided with a primary brake and at least one independent secondary brake, each capable of stopping and holding not less than 125 percent of the lifting capacity of the hoist.

(i) The primary brake must be directly connected to the drive train of the hoisting machine, and must not be connected through belts, chains, clutches, or set screw type devices. The brake must automatically set when power to the prime mover is interrupted.

(ii) The secondary brake must be an automatic emergency type of brake that, if actuated during each stopping cycle, must not engage before the hoist is stopped by the primary brake.

(iii) When a secondary brake is actuated, it must stop and hold the platform within a vertical distance of 24 inches (609.6 mm).

(j) Any component of a hoisting machine which requires lubrication for its protection and proper functioning must be provided with a means for that lubrication to be applied.

(5) Suspended equipment.

(a) General requirements.

(i) Each suspended unit component, except suspension ropes and guardrail systems, must be capable of supporting, without failure, at least 4 times the maximum intended live load applied or transmitted to that component.

(ii) Each suspended unit component must be constructed of materials that will withstand anticipated weather conditions.

(iii) Each suspended unit must be provided with a load rating plate, conspicuously located, stating the unit weight and rated load of the suspended unit.

(iv) When the suspension points on a suspended unit are not at the unit ends, the unit must be capable of remaining continuously stable under all conditions of use and position of the live load, and must maintain at least a 1.5 to 1 stability factor against unit upset.

(v) Guide rollers, guide shoes or building face rollers must be provided, and must compensate for variations in building dimensions and for minor horizontal out-of-level variations of each suspended unit.

(vi) Each working platform of a suspended unit must be secured to the building facade by one or more of the following methods, or by an equivalent method:

(A) Continuous engagement to building anchors as provided

in WAC 296-24-88015 (2)(a);

(B) Intermittent engagement to building anchors as provided in WAC 296-24-88015 (2)(c)(i);

(C) Button guide engagement as provided in WAC 296-24-88015 (2)(c)(ii);

(D) Angulated roping and building face rollers as provided in WAC 296-24-88015 (2)(c)(iii).

(vii) Each working platform of a suspended unit must be provided with a guardrail system on all sides which must meet the following requirements:

(A) The system must consist of a top guardrail, midrail, and a toeboard;

(B) The top guardrail must not be less than 38 inches (950 mm) high and must be able to withstand at least a 200-pound (890 n) force in any downward or outward direction;

(C) The midrail must be able to withstand at least a 75-pound (333 n) force in any downward or outward direction; and

(D) The areas between the guardrail and toeboard on the ends and outboard side, and the area between the midrail and toeboard on the inboard side, must be closed with a material that is capable of withstanding a load of 100 pounds (45.4 KG.) applied horizontally over any area of one square foot (.09 m²). The material must have all openings small enough to reject passage of life lines and potential falling objects which may be hazardous to persons below.

(E) Toeboards must be capable of withstanding, without failure, a force of at least 50 pounds (222 n) applied in any downward or horizontal direction at any point along the toeboard.

(F) Toeboards must be 4 inches (9 cm) minimum in length from their top edge to the level of the platform floor.

(G) Toeboards must be securely fastened in place at the outermost edge of the platform and have no more than one-half inch (1.3 cm) clearance above the platform floor.

(H) Toeboards must be solid or with an opening not over one inch (2.5 cm) in the greatest dimension.

(b) Two and four-point suspended working platforms.

(i) The working platform must be not less than 24 inches (610 mm) wide and must be provided with a minimum of a 12 inch (305 mm) wide passage at or past any obstruction on the platform.

(ii) The flooring must be of a slip-resistant type and must contain no opening that would allow the passage of life lines, cables and other potential falling objects. If a larger opening is provided, it must be protected by placing a material under the opening which must prevent the passage of life lines, cables and potential falling objects.

(iii) The working platform must be provided with a means of suspension that will restrict the platform's inboard to outboard

roll about its longitudinal axis to a maximum of 15 degrees from a horizontal plane when moving the live load from the inboard to the outboard side of the platform.

(iv) Any cable suspended from above the platform must be provided with a means for storage to prevent accumulation of the cable on the floor of the platform.

(v) All operating controls for the vertical travel of the platform must be of the continuous-pressure type, and must be located on the platform.

(vi) Each operating station of every working platform must be provided with a means of interrupting the power supply to all hoist motors to stop any further powered ascent or descent of the platform.

(vii) The maximum rated speed of the platform must not exceed 50 feet per minute (0.3 ms) with single speed hoists, nor 75 feet per minute (0.4 ms) with multispeed hoists.

(viii) Provisions must be made for securing all tools, water tanks, and other accessories to prevent their movement or accumulation on the floor of the platform.

(ix) Portable fire extinguishers conforming to the provisions of WAC 296-24-585 and 296-24-592 must be provided and securely attached on all working platforms.

(x) Access to and egress from a working platform, except for those that land directly on a safe surface, must be provided by stairs, ladders, platforms and runways conforming to the provisions of Parts J-1 and J-2 of chapter 296-24 WAC. Access gates must be self-closing and self-latching.

(xi) Means of access to or egress from a working platform which is 48 inches (1.2 m) or more above a safe surface must be provided with a guardrail system or ladder handrails that conform to the provisions of Parts J-1 and J-2 of chapter 296-24 WAC.

(xii) The platform must be provided with a secondary wire rope suspension system if the platform contains overhead structures which restrict the emergency egress of employees. A horizontal lifeline or a direct connection anchorage must be provided, as part of a fall arrest system which meets the requirements of Appendix C, for each employee on such a platform.

(xiii) A vertical lifeline must be provided as part of a fall arrest system which meets the requirements of Appendix C, for each employee on a working platform suspended by 2 or more wire ropes, if the failure of one wire rope or suspension attachment will cause the platform to upset. If a secondary wire rope suspension is used, vertical lifelines are not required for the fall arrest system, provided that each employee is attached to a horizontal lifeline anchored to the platform.

(xiv) An emergency electric operating device must be provided on roof powered platforms near the hoisting machine for

use in the event of failure of the normal operating device located on the working platform, or failure of the cable connected to the platform. The emergency electric operating device must be mounted in a secured compartment, and the compartment must be labeled with instructions for use. A means for opening the compartment must be mounted in a break-glass receptacle located near the emergency electric operating device or in an equipment secure and accessible location.

(c) Single point suspended working platforms.

(i) The requirements of (b)(i) through (xi) of this subsection must also apply to a single point working platform.

(ii) Each single point suspended working platform must be provided with a secondary wire rope suspension system, which will prevent the working platform from falling should there be a failure of the primary means of support, or if the platform contains overhead structures which restrict the egress of the employees. A horizontal life line or a direct connection anchorage must be provided, as part of a fall arrest system which meets the requirements of Appendix C, for each employee on the platform.

(d) Ground-rigged working platforms.

(i) Ground-rigged working platforms must comply with all the requirements of (b)(i) through (xiii) of this subsection.

(ii) After each day's use, the power supply within the building must be disconnected from a ground-rigged working platform, and the platform must be either disengaged from its suspension points or secured and stored at grade.

(e) Intermittently stabilized platforms.

(i) The platform must comply with (b)(i) through (xiii) of this subsection.

(ii) Each stabilizer tie must be equipped with a "quick connect-quick disconnect" device which cannot be accidentally disengaged, for attachment to the building anchor, and must be resistant to adverse environmental conditions.

(iii) The platform must be provided with a stopping device that will interrupt the hoist power supply in the event the platform contacts a stabilizer tie during its ascent.

(iv) Building face rollers must not be placed at the anchor setting if exterior anchors are used on the building face.

(v) Stabilizer ties used on intermittently stabilized platforms must allow for the specific attachment length needed to effect the predetermined angulation of the suspended wire rope. The specific attachment length must be maintained at all building anchor locations.

(vi) The platform must be in continuous contact with the face of the building during ascent and descent.

(vii) The attachment and removal of stabilizer ties must not require the horizontal movement of the platform.

(viii) The platform-mounted equipment and its suspension

wire ropes must not be physically damaged by the loads from the stabilizer tie or its building anchor. The platform, platform-mounted equipment and wire ropes must be able to withstand a load that is at least twice the ultimate strength of the stabilizer tie.

Note: See Figure 2 in Appendix B of this section for a description of a typical intermittent stabilization system.

(f) Button-guide stabilized platforms.

(i) The platform must comply with (b)(i) through (xiii) of this subsection.

(ii) Each guide track on the platform must engage a minimum of two guide buttons during any vertical travel of the platform following the initial button engagement.

(iii) Each guide track on a platform that is part of a roof rigged system must be provided with a storage position on the platform.

(iv) Each guide track on the platform must be sufficiently maneuverable by platform occupants to permit easy engagement of the guide buttons, and easy movement into and out of its storage position on the platform.

(v) Two guide tracks must be mounted on the platform and must provide continuous contact with the building face.

(vi) The load carrying components of the button guide stabilization system which transmit the load into the platform must be capable of supporting the weight of the platform, or provision must be made in the guide track connectors or platform attachments to prevent the weight of the platform from being transmitted to the platform attachments.

Note: See Figure 3 in Appendix B of this section for a description of a typical button guide stabilization system.

(6) Supported equipment.

(a) Supported equipment must maintain a vertical position in respect to the face of the building by means other than friction.

(b) Cog wheels or equivalent means must be incorporated to provide climbing traction between the supported equipment and the building guides. Additional guide wheels or shoes must be incorporated as may be necessary to ensure that the drive wheels are continuously held in positive engagement with the building guides.

(c) Launch guide mullions indexed to the building guides and retained in alignment with the building guides must be used to align drive wheels entering the building guides.

(d) Manned platforms used on supported equipment must comply with the requirements of (b)(i), (ii), and (iv) through (xi) of this subsection, covering suspended equipment.

(7) Suspension wire ropes and rope connections.

(a) Each specific installation must use suspension wire ropes or combination cable and connections meeting the specification recommended by the manufacturer of the hoisting

machine used. Connections must be capable of developing at least 80 percent of the rated breaking strength of the wire rope.

(b) Each suspension rope must have a "Design Factor" of at least 10. The "Design Factor" is the ratio of the rated strength of the suspension wire rope to the rated working load, and must be calculated using the following formula:

$$F = \frac{S(N)}{W}$$

Where:

F = Design factor

S = Manufacturer's rated strength of one suspension rope

N = Number of suspension ropes under load

W = Rated working load on all ropes at any point of travel

(c) Suspension wire rope grade must be at least improved plow steel or equivalent.

(d) Suspension wire ropes must be sized to conform with the required design factor, but must not be less than 5/16 inch (7.94 mm) in diameter.

(e) No more than one reverse bend in 6 wire rope lays must be permitted.

(f) A corrosion-resistant tag must be securely attached to one of the wire rope fastenings when a suspension wire rope is to be used at a specific location and will remain in that location. This tag must bear the following wire rope data:

- (i) The diameter (inches and/or mm);
- (ii) Construction classification;
- (iii) Whether nonpreformed or preformed;
- (iv) The grade of material;
- (v) The manufacturer's rated strength;
- (vi) The manufacturer's name;
- (vii) The month and year the ropes were installed; and
- (viii) The name of the person or company which installed the ropes.

(g) A new tag must be installed at each rope renewal.

(h) The original tag must be stamped with the date of the resocketing, or the original tag must be retained and a supplemental tag must be provided when ropes are resocketed. The supplemental tag must show the date of resocketing and the name of the person or company that resocketed the rope.

(i) Winding drum type hoists must contain at least 3 wraps of the suspension wire rope on the drum when the suspended unit has reached the lowest possible point of its vertical travel.

(j) Traction drum and sheave type hoists must be provided with a wire rope of sufficient length to reach the lowest possible point of vertical travel of the suspended unit, and an additional length of the wire rope of at least 4 feet (1.2 m).

(k) The lengthening or repairing of suspension wire ropes is prohibited.

(l) Babbitted fastenings for suspension wire rope are prohibited.

(8) Control circuits, power circuits and their components.

(a) Electrical wiring and equipment must comply with Part L of chapter 296-24 WAC, except as otherwise required by this section.

(b) Electrical runway conductor systems must be of a type designed for use in exterior locations, and must be located so that they do not come into contact with accumulated snow or water.

(c) Cables must be protected against damage resulting from overtoning or from other causes.

(d) Devices must be included in the control system for the equipment which will provide protection against electrical overloads, three phase reversal and phase failure. The control system must have a separate method, independent of the direction control circuit, for breaking the power circuit in case of an emergency or malfunction.

(e) Suspended or supported equipment must have a control system which will require the operator of the equipment to follow predetermined procedures.

(f) The following requirements must apply to electrical protection devices:

(i) On installations where the carriage does not have a stability factor of at least 4 against overturning, electrical contract(s) must be provided and so connected that the operating devices for the suspended or supported equipment must be operative only when the carriage is located and mechanically retained at an established operating point.

(ii) Overload protection must be provided in the hoisting or suspension system to protect against the equipment operating in the "up" direction with a load in excess of 125 percent of the rated load of the platform; and

(iii) An automatic detector must be provided for each suspension point that will interrupt power to all hoisting motors for travel in the "down" direction, and apply the primary brakes if any suspension wire rope becomes slack. A continuous-pressure rigging-bypass switch designed for use during rigging is permitted. This switch must only be used during rigging.

(g) Upper and lower directional switches designed to prevent the travel of suspended units beyond safe upward and downward levels must be provided.

(h) Emergency stop switches must be provided on remote

controlled, roof-powered manned platforms adjacent to each control station on the platform.

(i) Cables which are in constant tension must have overload devices which will prevent the tension in the cable from interfering with the load limiting device required in (f)(ii) of this subsection, or with the platform roll limiting device required in subsection (5)(b)(iii) of this section. The setting of these devices must be coordinated with other overload settings at the time of design of the system, and must be clearly indicated on or near the device. The device must interrupt the equipment travel in the "down" direction.

AMENDATORY SECTION (Amending WSR 00-08-078, filed 4/4/00, effective 7/1/00)

WAC 296-24-90003 General requirements. (1) Application. These standards apply to the construction, maintenance, inspection, and operation of manlifts in relation to accident causing hazards. Manlifts covered by these standards consist of platforms or brackets and accompanying handholds mounted on, or attached to an endless belt, operating vertically in one direction only and being supported by, and driven through pulleys, at the top and bottom. These manlifts are intended for conveyance of persons only. It is not intended that these standards cover moving stairways, elevators with enclosed platforms ("Paternoster" elevators), gravity lifts, nor conveyors used only for conveying material. These standards apply to manlifts used to carry only personnel trained and authorized by the employer in their use.

(2) Exceptions for new and existing equipment. The purpose of these standards is to provide reasonable safety for life and limb.

(3) Design requirements. All new manlift installations and equipment installed after the effective date of these standards must meet the design requirements of the "American National Safety Standard for Manlifts ANSI A90.1-1969," and the requirements of this section.

(4) Reference to other codes. The following codes are applicable to this section. Safety Code for Mechanical Power Transmission Apparatus ANSI B15.1-1953 (R 1958) (~~and chapter 296-24 WAC Part C~~); chapter 296-806 WAC Machine safety; chapter 296-24 WAC Part L; Safety Code for Fixed Ladders, ANSI A14.3-1956 and Safety Requirements for Floor and Wall Openings, Railings and Toeboards, ANSI A12.1-1967 and chapter 296-24 WAC Parts J-1 and J-2.

(5) Floor openings.

(a) Allowable size. Floor openings for both the "up" and "down" runs must be not less than 28 inches nor more than 36 inches in width for a 12-inch belt not less than 34 inches nor more than 38 inches for a 14-inch belt; and not less than 36 inches nor more than 40 inches for a 16-inch belt and must extend not less than 24 inches, nor more than 28 inches from the face of the belt.

(b) Uniformity. All floor openings for a given manlift must be uniform in size and must be approximately circular, and each must be located vertically above the opening below it.

(6) Landing.

(a) Vertical clearance. The clearance between the floor or mounting platform and the lower edge for the conical guard above it required by WAC 296-24-90003(7) must not be less than 7 feet 6 inches. Where this clearance cannot be obtained no access to the manlift must be provided and the manlift runway must be enclosed where it passes through such floor.

(b) Clear landing space. The landing space adjacent to the floor openings must be free from obstruction and kept clear at all times. This landing space must be at least 2 feet in width from the edge of the floor opening used for mounting and dismounting.

(c) Lighting and landing. Adequate lighting not less than 5-foot candles, must be provided at each floor landing at all times when the lift is in operation.

(d) Landing surface. The landing surfaces at the entrances and exits to the manlift must be constructed and maintained as to provide safe footing at all times.

(e) Emergency landings. Where there is a travel of 50 feet or more between floor landings, one or more emergency landings must be provided so that there will be a landing (either floor or emergency) for every 25 feet or less of manlift travel.

(i) Emergency landings must be accessible from both the "up" and "down" rungs of the manlift and must give access to the ladder required in WAC 296-24-90003(12).

(ii) Emergency landings must be completely enclosed with a standard railing and toeboard.

(iii) Platforms constructed to give access to bucket elevators or other equipment for the purpose of inspection, lubrication, and repair may also serve as emergency landings under this rule. All such platforms will then be considered part of the emergency landing and must be provided with standard railings and toeboards.

(7) Guards on underside of floor openings.

(a) Fixed type. On the ascending side of the manlift floor openings must be provided with a bevel guard or cone meeting the following requirements:

(i) The cone must make an angle of not less than 45° with

the horizontal. An angle of 60° or greater must be used where ceiling heights permit.

(ii) The lower edge of this guard must extend at least 42 inches outward from any handhold on the belt. It must not extend beyond the upper surface of the floor above.

(iii) The cone must be made of not less than No. 18 U.S. gauge sheet steel or material of equivalent strength or stiffness. The lower edge must be rolled to a minimum diameter of one-half inch and the interior must be smooth with no rivets, bolts or screws protruding.

(b) Floating type. In lieu of the fixed guards specified in WAC 296-24-90003 (7)(a) a floating type safety cone may be used, such floating cones to be mounted on hinges at least 6 inches below the under side of the floor and so constructed as to actuate a limit switch should a force of 2 pounds be applied on the edge of the cone closest to the hinge. The depth of this floating cone need not exceed 12 inches.

(8) Protection of entrances and exits.

(a) Guardrail requirement. The entrances and exits at all floor landings affording access to the manlift must be guarded by a maze (staggered railing) or a handrail equipped with self-closing gates.

(b) Construction. The rails must be standard guardrails with toeboards meeting the provisions of the Safety Requirements for Floor and Wall Openings, Railings and Toeboards, ANSI A12.1-1967 and WAC 296-24-750 through 296-24-75011.

(c) Gates. Gates, if used, must open outward and must be self-closing. Corners of gates must be rounded.

(d) Maze. Maze or staggered openings must offer no direct passage between enclosure and outer floor space.

(e) Except where building layout prevents, entrances at all landings must be in the same relative position.

(f) If located in buildings to which the public has access, such manlift or manlifts must be located in an enclosure protected by self-closing spring-locked doors. Keys to such doors must be limited to authorized personnel.

(9) Guards for openings.

(a) Construction. The floor opening at each landing must be guarded on sides not used for entrance or exit by a standard railing and toeboard or by panels or wire mesh of not less than Number 10 U.S. gage, expanded metal of not less than Number 13 U.S. gage or sheet metal of equivalent strength.

(b) Guardrails in stairwells. When belt manlift is installed in a stairwell a standard guardrail must be placed between the floor openings of the manlift and the stairways.

(c) Height and location. Such rails or guards must be at least forty-two inches in height on the "up" running side and sixty-six inches on the "down" running side. If a guardrail is used the section of the guard above the rail may be of the

construction specified in WAC 296-24-90003 (9)(a) or may consist of vertical or horizontal bars which will reject a ball six inches in diameter. Rails or guards must be located not more than one foot from the edge of the floor opening.

(d) Safeguards required. Expanded metal, sheet metal or wood guards must be installed to cover the area from the floor to seven feet above the floor on each exposed side of the belt manlift at each floor landing, so persons cannot place their hands in the area where the step rollers travel.

(10) Bottom arrangement.

(a) Bottom landing. At the bottom landing the clear area must be not smaller than the area enclosed by the guardrails on the floors above, and any wall in front of the down-running side of the belt must be not less than 48 inches from the face of the belt. This space must not be encroached upon by stairs or ladders.

(b) Location of lower pulley. The lower (boot) pulley must be installed so that it is supported by the lowest landing served. The sides of the pulley support must be guarded to prevent contact with the pulley or the steps.

(c) Mounting platform. A mounting platform must be provided in front or to one side of the uprun at the lowest landing, unless the floor level is such that the following requirement can be met: The floor or platform must be at or above the point at which the upper surface of the ascending step completes its turn and assumes a horizontal position.

(d) Guardrails. To guard against persons walking under a descending step, the area on the downside of the manlift must be guarded in accordance with WAC 296-24-90003(8). To guard against a person getting between the mounting platform and an ascending step, the area between the belt and the platform must be protected by a guardrail.

(11) Top arrangements.

(a) Clearance from floor. A top clearance must be provided of at least 11 feet above the top terminal landing. This clearance must be maintained from a plane through each face of the belt to a vertical cylindrical plane having a diameter 2 feet greater than the diameter of the floor opening, extending upward from the top floor to the ceiling on the up-running side of the belt. No encroachment of structural or machine supporting members within this space will be permitted.

(b) Pulley clearance.

(i) There must be a clearance of at least 5 feet between the center of the head pulley shaft and any ceiling obstruction.

(ii) The center of the head pulley shaft must be not less than 6 feet above the top terminal landing.

(c) Emergency grab rail. An emergency grab bar or rail and platform must be provided at the head pulley when the distance to the head pulley is over 6 feet above the top landing,

otherwise only a grab bar or rail is to be provided to permit the rider to swing free should the emergency stops become inoperative.

(12) Emergency exit ladder. A fixed metal ladder accessible from both the "up" and "down" run of the manlift must be provided for the entire travel of the manlift. Such ladder must be in accordance with ANSI A14.3-1956, Safety Code for Fixed Ladders and WAC 296-24-810 through 296-24-81013.

(13) Superstructure bracing. Manlift rails must be secured in such a manner as to avoid spreading, vibration, and misalignment.

(14) Illumination.

(a) General. Both runs of the manlift must be illuminated at all times when the lift is in operation. An intensity of not less than 1-foot candle must be maintained at all points. (However, see WAC 296-24-90003 (6)(c) for illumination requirements at landings.)

(b) Control of illumination. Lighting of manlift runways must be by means of circuits permanently tied into the building circuits (no switches), or must be controlled by switches at each landing. Where separate switches are provided at each landing, any switch must turn on all lights necessary to illuminate the entire runway.

(15) Weather protection. The entire manlift and its driving mechanism must be protected from the weather at all times.